CLAIMS

Please rewrite claims 1, 20, 21, 22, 23, 31, 35, 38, and 39 as follows:

1. A method for spatial demultiplexing interfering signals comprising the steps of
   - transforming a discreet-time input signal into a plurality of spectral components,
   - computing a set of weights for each of a plurality of channels with respect to channel fading,
   - applying said weights to said spectral components, and
   - providing for multi-stage combining of the weighted spectral components to cancel co-channel interference.

20. A method for spatial demultiplexing interfering signals comprising the steps of
   - transforming a discreet-time input signal that includes a plurality of interfering signals into a plurality of spectral components, the spectral components having differences in either or both amplitude variations and phase variations, and
   - providing for multi-stage demultiplexing of the interfering signals by processing either or both the amplitude variations and the phase variations of the plurality of spectral components in a multi-stage demultiplexer.

21. The method of claim 20 wherein the step of transforming the discreet input signals includes a step of separating a plurality of interfering information signals modulated on each of the spectral components and passing the information signals to the step of providing for multi-stage demultiplexing of the interfering signals.

22. The method of claim 20 wherein the step of providing for multi-stage demultiplexing of the interfering signals involves a constellation processing method.

23. The method of claim 20 wherein the discreet-time input signals are derived from a plurality of received signals, the received signals being transmit signals that have

propagated in a free-space or guided-wave environment after being transmitted by a plurality of transmitters.

31. A method for spatial demultiplexing interfering signals comprising the steps of

- transforming a receive signal that includes a plurality of interfering signals into a plurality of diversity components, the diversity components having differences in either or both amplitude variations and phase variations, and
- providing for multi-stage demultiplexing of the interfering signals by processing either or both the amplitude variations and the phase variations of the plurality of diversity components in a multi-stage demultiplexer.

35. An apparatus for spatially separating a plurality of interfering received signals, each of the received signals having a different amplitude-versus-frequency profile, the apparatus comprising

- a diversity receiver adapted to separate the received signals into a plurality of frequency components, and
- a multistage spatial demultiplexer adapted to separate the received signals in the frequency components.

38. The apparatus of claim 35 wherein the spatial demultiplexer comprises

- a weight generation unit adapted to generate [for generating] a plurality of weights based on the amplitude-versus-frequency profiles of the received signals, and
- a multistage combining unit adapted to perform multi-stage [for] weighting and combining of the plurality of received signals using the generated plurality of weights to enhance signal to interference of at least one of the received signals by canceling interfering signals.

39. The apparatus of claim 35 wherein the multistage spatial demultiplexer is adapted to separate the [separates] received signals by comparing the received signals to a constellation of points.